

W. W. Hansen Experimental Physics Laboratory

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Gravity Probe B Relativity Mission

PROCEDURE FOR

Science Telescope Field of View Scans

GP-B P0229 Rev -

January 20, 1998

Prepared by: Suwen Wang Engineer

Approved by: John Lipa Manager, Telescope Development

Approved by: B. Taller Quality Assurance

Approved by: J. Turneaure Hardware Manager Date

Date

Date

Date

GP-B Procedure Document 229

Science Telescope Field of View Scans

R. E.: Suwen Wang ESTIMATED DURATION: 1 day.

Objective:

Perform measurements on telescope response in the range of the entire field of view along the orthogonal readout axes.

Requirements:

- Procedure to be performed by certified personnel only.
- Certified personnel include: Suwen Wang

Authority to redline this procedure:

Suwen Wang

Precautions:

- Science Telescope is well protected in the test probe in this procedure. No direct or indirect mechanical contact will be made to the telescope. Therefore, no special caution is needed in handling in this procedure.
- No special electrostatic handling precaution required.

Calibration:

• The scan data related to verifying the telescope performance specifications is in a format of relative numbers. Therefore, no calibration is required for the procedure.

Ground Support Equipment required:

- Telescope room temperature readout electronics.
- Centris 650 computer with data acquisition system.

Expendable Materials required:

• None.

Initial Configuration:

- Telescope under test:
 Dwg No: 25091-201 Rev Telescope Serial No.
- Telescope probe being attached to Artificial Star #2.
- Procedure Start Date:

^{1.} Procedure for a scan:

- 1.1. Align the star so that the image forms on the telescope axis to within 1 arc sec.
- 1.2. Set instrument parameters per table 1 below.
- 1.3. Open the application ScanStar v. 1.0 if it is not already open. The application is on MacIntosh Centris 650 located in Telescope Lab.
- 1.4. Set all the parameters as indicated in table 2 below. Set A Mtr # to Dewar X.
- 1.5. Click the run arrow in the application to start the scan.
- 1.6. Make sure that no one is allowed to touch the star during the scan.
- 1.7. When the scan is complete, the run busy signal will disappear.
- 1.8. A set of files of the name: Scan_Dir#_date will be created.

Here:

Dir can be either x or y for the scan direction

is the serial number of the scan of the day

date is the date in the format of m/d/y

- 1.9. Record the file names in table 3 below.
- 1.10. Set A Mtr # to Dewar Y and repeat procedures 1.6 through 1.10.
- 1.11. Procedure 1 complete.

Signed: _____ Date: _____

- 2. Data analysis
- 2.1 Plot the scan data with Igor Pro software.
- 2.2 Determine the peak signal for each channel.
- 2.3 Determine the field of view for 5% of the peak intensity and 10% of the peak intensity for each axis and give the numbers below.

+X axis, 5%:

+X axis, 10%:

-X axis, 5%:

-X axis, 10%;

+Y axis, 5%:

+Y axis, 10%:

-Y axis, 5 %:

-Y axis, 10%:

Table 1. Instrument Parameter Settings

(Tolerances are 10% unless otherwise noted)

Instrument/Parameter Name	Setting	Inspector Stamp
Star Suspension	55 psi front, 35 psi back	
Star Chamber Pressure	500 torr nominal	
Star Laser Diode Current	11.0 mA (+/- 0.1 mA)	
Star Focus Adjustment	At focal point (6 turns out)	
Telescope Probe Pressure	At vacuum (< 1 torr)	
Telescope Temperature	295 K	

Table 2. Application Parameter Settings

Button Name	Setting	Inspector Stamp
Function	Init & Run	
Serial Port	IP Serial B	
Scan Type	X Scan	
Init Mtr Mvmnt	Rewind	
Mtr Spd (stps/sec)	50	
Mtr/PZT	Stp Mtr	
# Grids	600	
Tot # Stps	1200 or as appropriate	
Init A	0.50	
Init B	0.50	
A Mtr #	Dewar X or Dewar Y	
B Mtr #	NOT USED	
Init Mov Dirtn	Positive	
Sample Rate (1/sec)	NOT USED	
# Samples/Chan	NOT USED	
Sample Mode	Slope	
Seq #	1	
A/D Brd #	6	
Chan Seq.	0 - 0, 1-1, 7-7	
Gains	0-7: 100	
Starting	0.2	
Fit	0.6	
Preamp Gain	1 for RT and 100 for LT	

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# pts	250	
# of slp Avrg	10	
Data Rate	2500.00	

Table 3. File Names for Fine Scans

File Path Name:

Temperature	Scan Sequence #	Date	Scan Axis
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